SECTION 16714

ZINC COATED STEEL WIRE STRAND

PART 1 GENERAL

1.01 SECTION INCLUDES

This specification covers zinc coated steel wire strand for use as messengers for supporting aerial cable, signaling equipment and for guying of overhead poles.

1.02 UNIT PRICE

A. Measurement
Measurement for span wire messenger used to support communication and interconnect cable will be measured by linear foot.

Measurement for span wire mounted signals will be measured by the intersection installation on a lump sum basis, as specified.

B. Payment
The work performed and materials furnished in accordance with this item and as provided under "Measurement" will be paid for at the unit price bid for zinc steel wire strand of the various types and sizes specified. This price shall be full compensation for furnishing and installing all materials, and for all labor, tools, equipment and incidentals necessary to complete the work.

PART 2 PRODUCTS

2.01 MATERIAL

The material covered by this specification shall be strand composed of round zinc coated steel wires of characteristics necessary to produce a finished product which will meet all of the requirements of this specification. All wires of the strand shall be of the same quality.

A. Zinc. The zinc used for the coating shall be of any grade of zinc conforming to the Standard Specifications for Slab Zinc (Spelter) ASTM Designation B6 of the American Society for Testing Materials.

2.02 COATING

A. Weight and Uniformity of Coating. The wires from the finished strand shall have a weight of zinc coating and a uniformity of zinc coating not less than the values in Table I.

1. The weight of coating shall be tested by the Stripping Method in accordance with the Standard Methods of Test for Weight of Coating on Zinc Coated (galvanized) Iron and Steel Articles (ASTM Designation A90) of the American Society of Testing Materials.

2. The uniformity of the zinc coating shall be determined by the Preece Test as described in the Standard Method of Test for Uniformity of Coating by the Preece Test (Copper Sulphate Dip) on Zinc Coated (galvanized) Iron or Steel Articles (ASTM Designation A239) of the American Society for Testing Materials.

   This test shall not be used to determine the weight of the coating and shall be applied only after the coating has been found to conform to the minimum weight of coating requirement.

B. Adherence of Coating. The zinc coating shall adhere to the wire without flaking and without being removable by rubbing with the bare fingers after the individual wires have been wrapped in a close helix at least twice at the rate of not more than fifteen turns per minute around a cylindrical mandrel with a diameter equal to three times the nominal diameter of the wires of the strand.

2.03 DIAMETER, PITCH AND LAY, STRAND, AND JOINTS

A. Diameter. Sizes of wire shall be expressed by the diameter in decimal fractions of an inch.

B. Pitch and Lay. The pitch of the strand shall not be less than 10 nor more than 16 times the outside diameter of the strand for 3 wire strand. On 7 wire strand the pitch of the strand shall be not less than 12 or more than 16 times the outside diameter of the strand. Left lay strand shall be furnished unless otherwise specified on the Purchase Order. Stranding shall be sufficiently close to insure no appreciable reduction in diameter when stressed 10% of specified strength.

C. Preformed Strand. Preformed strand shall be supplied when so specified by the purchaser. Strand is preformed when the component wires are set to the helical form that they assume in the product by any means or process other than by merely laying them about the strand core.

D. Joints. There shall be no strand joints or strand splices in any length of complete strand. Joints in individual wires in their finished size shall be either the brazed type or electric butt welded type. When the brazed type of joint is used, the length of the lap shall be not less than three times the diameter of the wire and the overlapping faces shall be smooth, clean and properly fluxed, and completely covered with brazing metal. When the electric welded type of joint is used, care shall be taken to prevent injury to the wire by reason of overheating. All joints shall be made well, and shall be coated with zinc after completion.

In three wire strand there shall be no joints in individual wires. In seven wire strand, joints in individual wires shall be acceptable provided there is no more than one joint in any 150 foot section of the completed strand.

2.04 PROPERTIES

A. Properties. The finished zinc coated strand shall have characteristics and properties in accordance with the requirements of Table II.

B. Breaking Strength and Elongation. The breaking strength and elongation tests shall be made on 24 inch samples which do not contain wire joints. The elongation shall be determined by the increase in separation between the jaws of the testing machine at the initial failure in the test specimen. The separation of the jaws of the testing machine shall be approximately 2 feet when under a load equal to 10 percent of the required minimum breaking strength of the strand. The elongation values shall be recorded only for specimens which break over one inch from the jaws of the testing machine.

C. Ductility of Steel. The individual wires of the completed strand shall not fracture when wrapped in a close helix at least twice around the cylindrical mandrel at the rate of not more than fifteen turns per minute. The mandrel in terms of the diameter of the individual wire shall be as given in Table II.

2.05 WORKMANSHIP AND FINISH

The zinc coated wire shall be uniform in diameter and shall be free from splings, scales, inequalities, flaws and other imperfections not consistent with good commercial practice. The zinc coating shall be smooth and continuous.

PART 3 EXECUTION

3.01 SAMPLING, INSPECTION, AND ACCEPTANCE

Where the lot consists of 25,000 feet or less of strand, two samples for mechanical tests shall be taken from separate reels or coils in the lab except where the total amount of strand is 5,000 feet or less, when only one sample shall be required.

If the lot consists of more than 25,000 feet, one sample shall be taken from every 15,000 feet or fraction thereof, but in no case less than three samples for any size of strand.

The contractor shall furnish a certified report of the test made on the cable to show compliance with this specification.

Each coil or reel which fails to meet this specification may be rejected.

In case there is a reasonable doubt in the first trial as to the failure of the wire or strand to meet any requirements of these specifications, two additional tests shall be made on samples of wire or strand from the same coil or reel, and if failure occurs in either of these tests, the strand shall be rejected.

Inspection and tests shall be in accordance with Section 14 of I.M.S.A. Specification No. 1-1950, latest revision.

TABLE I

DIMENSIONS, WEIGHT OF COATING, UNIFORMITY OF COATING OF ZINC COATED STEEL WIRES

Nominal Diameter of Wire, Inch	Minimum Weight of Coating-oz. per Square Foot of Uncoated Wire	Uniformity of Coating-Minimum Number of Dips Preece Test	Permissible Variation in Diameter of Coated Wire Inch
0.062	0.50	2-1/2	.003
0.072	0.50	2-1/2	.003
0.080	0.60	3	.003
0.093	0.70	3	.004
0.100	0.70	3	.004
0.104	0.80	4	.004
0.109	0.80	4	.004
0.120	0.85	4	.004
0.145	0.90	4	.005
0.165	0.90	4	.005

TABLE II

PHYSICAL PROPERTIES OF ZINC COATED STEEL WIRE STRAND

7 Wire Strand (Siemens Martin)

Nominal Diameter of the Strand	Nominal Diameter Coated Wires in Strand, Inches	Approximate Weight of Strand lbs/1000 ft	Minimum Break Strength of Strand lbs	Minimum Elongation 24" Percent	Ductility of Steel Mandrel Diameter
3/16	.062	72.9	1900	8	1
1/4	.080	121	3150	8	1
9/32	.093	164	4250	8	1
5/16	.104	205	5350	8	1

TABLE II (Continued)

PHYSICAL PROPERTIES OF ZINC COATED STEEL WIRE STRAND

Nominal Diameter of the Strand	Nominal Diameter Coated Wires in Strand, Inches	Approximate Weight of Strand lbs/1000 ft	Minimum Break Strength of Strand lbs	Minimum Elongation 24" Percent	Ductility of Steel Mandrel Diameter
		7 Wire Strand (High Strength)			
5/16	.109	225	8000	5	3
3/8	.120	273	10800	5	3
7/16	.143	399	14500	5	3
1/2	.165	517	18800	5	3
		7 Wire Strand (Extra High Strength)			
5/16	.104	205	11200	4	3
3/8	.120	273	15400	4	3
7/16	.145	399	20800	4	3
1/2	.165	517	26900	4	3
		3 Wire Strand (High Strength)			
1/4*	.120	116.7	2979	8	1
1/4	.120	116.7	4629	5	3
5/16	.145	170.6	6214	5	3
3/8	.165	220.3	8057	5	3

*Siemens Martin

Note: Minimum requirements of any strand sizes and grades not shown above will conform to A.I.S.I. standards, latest revision.

END OF SECTION